MADHYANCHAL
PROFESSIONAL UNIVERSITY

Syllabus

for

Ph. D in Botany

Paper - I

Biology and diversity of virus, Bacteria, Fungi, Algae, Bryophyta, Pteridophyta

General account, classification, ultra structure, nutrition, Reproduction and Economic importance of Virus, Archaebacteria, Eubacteria, Cynobacteria, Mycoplasma, Actinomycetes, Rickettsiae, Chlamydiae

General Characteristics, Classification, Ultra structure, Reproduction and Economic Importance of fungi. Fungi in Medicine, Food, Antibiotics, Vitamins, steroids, Fermentation, Industries, Mycorrhiza, Biocontrol agent, Fungal disease in plant & Humans

General characteristics, .Diversified habitat, Classification, Thallus organization, Ultra structure, Nutrition, pigmentation, Flagella Reproduction and Economic Importance of Algae.

General characteristics, Distribution, Classification, Morphological Structure, Reproduction, Life history Ecological & Economical importance of Bryophytes

General Characteristics, Classification, Internal & External Morphology, Reproduction,& life history of Pteridophytes.

Biology and Diversity of Phanerogames

General Characteristics, Classification, Evolution, Distribution, Complexity of gametophyte(Reproduction) Economic Importance of Living and fossil Gymnosperms

Origin and Evolution of Angiosperms, Plant Identification, Angiosperms Taxonomy-Aims, Fundamental component (Alpha, Beta & Gama) Principle and rules of Nomenclature, modern trends in Taxonomy, Taxonomic Tools,

Herbarium, Flora, Botanical Garden, Classification of Angiosperms, Primitive angiosperms.

Flower development, Morphology of Stamens and Carpel & their Evolution, Diagnostic characteristic, Economic Importance and members of families of dicot and monocot.

Apical and floral meristems, SAM,RAM, Root & Shoot growth & Differentiation Tissues, Secondary growth (normal and abnormal),Leaf growth and differentiation, Secretary ducts and laticifers, lateral roots, root hairs, root microbe interaction.

Vegetative and sexual Reproduction, Microsporogenesis, Development of male gametophytes, Megasporogenesis, Development of female gametophytes, Pollination, Self incompatibility, Double fertilization, Embryogenesis, types of endosperms & their development, Polyembryoni, apomixes, Fruit & Seed development and dispersal.

[Molecular Biology

Structural organization of Prokaryotic & eukaryotic plant cell, Structure and function of cell wall, cytoskeleton, Plasma membrane and cell organelles,

Chromosome structure and their special types, karyotypes analysis & evolution, structural and numerical changes in chromosomes, cell division, & cell cycle

Genetics of prokaryotes and eukaryotes, Cytoplasmic & gene interaction, Male sterility, Molecular marker.

Conformation of nucleic acid (A,B,Z, DNA, RNA)DNA replication, repair and damage, recombination. Mutation, conformation of Protein.(Ramchendran plot), secondary, tertiary, and quaternary structure of protein & protein synthesis, Transposable elements

Control of gene expression at transcriptional & translation level, Immune system and cancer.

Plantphysiology,BiochemistryBiotechnology,Tissueculture

Plant water relation,Absorption, Transpiration of water and food, Cell signaling, Principles of thermodynamics, Signal transduction receptors, pathway.

Enzyme, Nitrogen metabolism, Photosynthesis, Respiration, Carbohydrate, Lipid & Protein.

Plant Growth Regulators and Elicitors, Flowering process (floral induction, Development, Photoperiodism Phytochrome, Cryptochrom, Photomorphogenetic receptors, vernalization.) & Stress Physiology.

Principle and scope of Biotechnology, Intellectual property rights, Recombinant DNA technology, Genomic and cDNA library , PCR, DNA finger printing, Genetic engineering of plants, Transgenic, Genetic manipulation of microbes, Molecular markers, Role of Biotechnology in Industries, medicine and Agriculture.

General Introduction & scope of plant cell and tissue culture techniques of tissue culture, Organogenesis and advanced embryogenesis, Somatic hybridization Application of plant tissue culture, Secondary metabolites, Cryo preservation and germplasm storage.

Environmental Biology and economic Botany

Principle & scope of environmental Biology, Earth Man & Environment, Physicochemical and Biological factors, Wetlands & Waste land conservation, Natural resources and Sustainable development,

Ecosystem Component, Energy flow, Food chain and food web, Succession, Ecological adaptation, Community.

Biodiversity and its conservation, Field bank and Gene bank, Seed bank, In vitro depositories, National parks, Sanctuaries, Botanical garden, Biosphere reserves, Hot spots, Endemism, Endangered and Threatened species.

Geological hazards –landslides, floods, Earth quake, Volcanism, Avalanche, Natural and Anthropogenic source of pollution and their management , Climate change and Global warming, Environmental laws and Education.

Utilization of resource from forest, grass land and aquatic habitats, food forage and fodder, timber, non wood forest products, Ethnobotany scope, importance

PAPER –II

General Aptitude (GA)

Verbal Ability: English grammar, sentence completion, verbal analogies, word groups, instructions, critical reasoning and verbal deduction.

Numerical Ability: Numerical computation, numerical estimation, numerical reasoning and data interpretation.